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The Journal of the Telephone Industry

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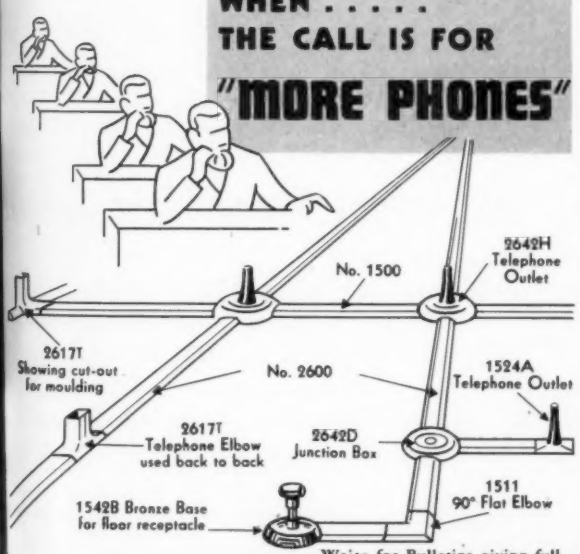

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TELEPHONY

The Journal of the Telephone Industry

DECEMBER 22, 1945

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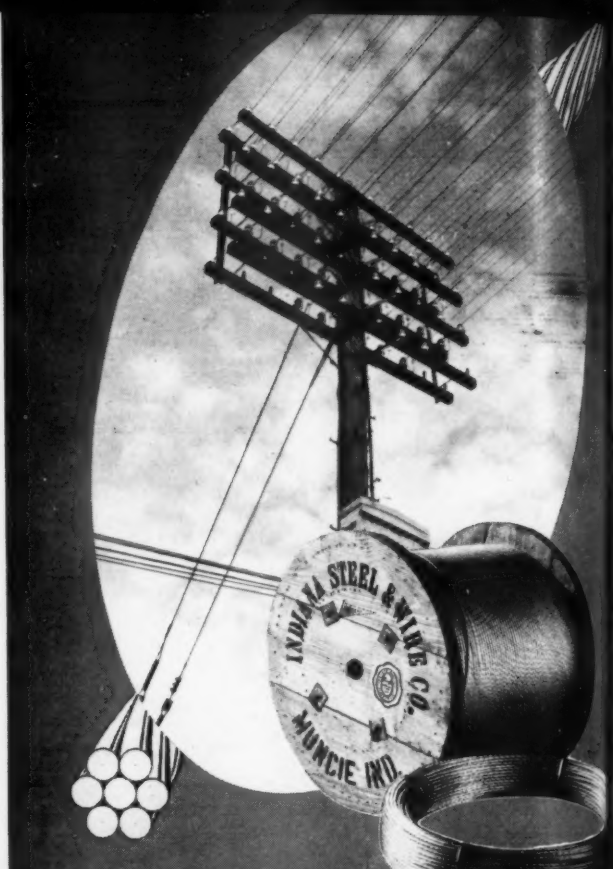

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A NEW SUBMERGED REPEATER

For Submarine Cables

By JOHN H. JUPE

FOREWORD: *My thanks for being able to write this article are due to the British GPO, the Institution of Electrical Engineers and, especially, to R. J. Halsey who has allowed me to draw freely on his paper "Modern Submarine Cable Telephony and the Use of Submerged Repeaters," published in the Journal I.E.E., Vol. 91, Part III, No. 16.*

* * *

THE USE of submerged repeaters in submarine telephony is by far the most profitable method of increasing the efficient utilization of cables and enables the range to be increased many times; the limit being set by the DC or AC characteristics of the cable, which restrict the supply of power.

It is understood that a type of repeater has been developed by the Bell Telephone Laboratories for deep sea service, using tubes having a service life of 20 years. This article deals with a very different type of repeater, developed by the British Post Office for depths up to about 200 fathoms and first laid in the Irish Sea in 1943.

The cable, including the repeater, has a length of 43.9 nauts (one naut equals 2,029 yards) and originally the maximum frequency which could be transmitted without the use of companding, was about 250 kc. This was divided into 24 channels, 12-108 kc. one way and 132-228 the other. With the submerged repeater, the frequency band 36-228 kc. now is used for 48 channels in one direction, without amplification in the repeater, and 312-504 kc. in the opposite direction, with gains of 57 and 70 db at 312 and 504 kc., respectively.

[EDITOR'S NOTE: *The expression "companding" is linked with the words compressor and expandor which will appear in a technical dictionary only.*

A compressor is a thermionic device at the transmitting end of a system to reduce the contrast in speech or music; contrast being, of course, the relationship between the maximum intensity level and the minimum useful intensity level. By making this reduction, transmission may be at an average higher level and so help to overcome the effects of interference, etc.

An expandor is the corresponding amplifying device for increasing the contrast at the receiving end.

Combining the two words, one may say that there is a compandor on the system or that companding is used.]

An inner brass cylinder houses the equipment, with an outer pressure chamber of welded steel plates designed to withstand a water pressure of 1,000 lbs. per square inch *(Fig. 1)*.

Commercial types of tubes are used in the amplifier and to ensure a reasonable life, each of the three stages has three tubes, any one of which can be brought into circuit by DC switching controlled from a shore station.

No tubes with a life much in excess of 20,000 hours are available yet in Great Britain and it was decided to use the best commercial tubes available. These proved to be mazda SP.41 (6.3 v. 0.63 amp.). On a basis of life tests made on 100 tubes, it was estimated that the probable life of the amplifier would be 49,000 hours ± 7,000 hours, i.e., about five years.

The amplifier is fed with direct current from a shore station (not the tube switching one) and is regulated at 0.63 amp. at 230 v. *Table 1* shows the advantages and disadvantages of DC compared with power frequency AC.

Corrosion of the cable on DC is avoided by connecting the negative supply to the central conductor and the positive supply to an earth plate in the sea some distance from the cable entry; the earth plate then corrodes.

Switching of the repeater is accom-

Fig. 1. Submerged repeater, outer case.

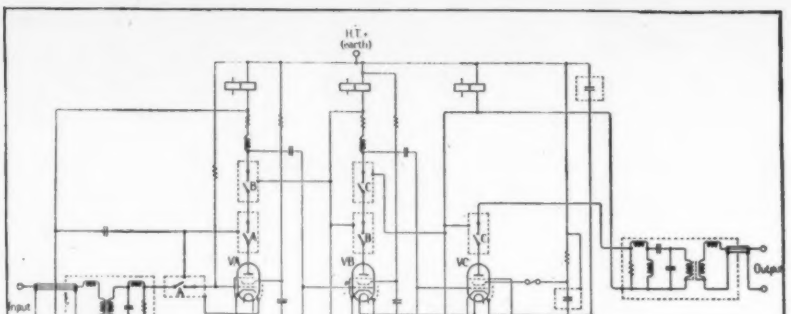


Fig. 2. Submerged repeater, amplifier schematic.

plished with the following main features:

(1) A minimum of apparatus is located in the repeater.
(2) Safety of apparatus in the repeater is high.
(3) Where possible, switching apparatus in the repeater normally is in a non-excited condition.

Only those tubes in use have their heaters energized, the appropriate connections being made by a uni-selector with chromium plated contacts and wipers, and without brushes. Another selector at the control station repeats the setting of the one submerged.

In addition to the 27 possible heater combinations, the uni-selectors also provide modified "open" and "short circuit" tests on the cable. When the selected heaters are energized, associated series relays operate to connect the corresponding grids and anodes. Screened relay springs are used, operated by glass push-rods and introducing a direct grid-anode capacitance of only 0.005 UUF. Switching of the tube electrodes is preferred to parallel connection, since the total capacitance is lower and the risk of total failure, due to electrode contacts, largely is eliminated.

An alarm condition is set up when the anode current in any stage falls to about half its normal value. The switching circuit is arranged so that tubes cannot be changed unless such a condition exists. At the control station, the switching control is arranged so that, on receipt of the alarm condition (a loop current of about 10 mA.), the tube combination can be changed, either manually or automatically, by increasing the loop current to about 80 mA.

ADVANTAGES OF DIRECT CURRENT

(1) Line attenuation is lower.
(2) Filtration of power supply in repeater is simple.
(3) Audio frequency circuit can be operated more readily.
(4) Switching is more easily effected.
(5) No check back of voltage at the repeater is necessary.
(6) The tube manufacturer expects a longer effective life with DC filament heating.

DISADVANTAGES OF DIRECT CURRENT

(1) Dissipation of power in the repeater is high, with standard 6.3 v. tubes.
(2) Tube heaters must be wired in series.
(3) Care must be taken to ensure that electrolytic corrosion does not occur at inaccessible points.

Table 1

The power failure alarm is operated by failure of a 10-kc. tone sent through the cable. An artificial fault condition can be created should it be necessary to change the tubes when a real fault does not exist.

A schematic of the amplifier is shown in *Fig 2*, and *Fig. 3* shows a general view of the equipment. Every tube has its own coupling network, which allows the grid connections of the last two stages to be switched at points where the anode current from the previous tube is present.

Both the input and output transformers are designed as filter sections. In the output circuit there are two impedance transforming sections for utilizing the leakage inductance and circuit capacitances to maximum advantage, and to enable a transformer having a lower impedance ratio to be used. The input transformer operates between 52 and 10,000-ohm impedances and the output network, between 17,500 and 52 ohms, the return loss always being greater than 20 db at working frequencies.

Negative feedback is taken from the cathode circuit of the output stage to that of the input stage, and includes the network necessary to give the required over-all gain frequency characteristic in the working range. With the interstage couplings and the input and output circuits, this network also determines the cut off characteristics above and below the working band and, hence, the margin of stability against oscillation. Impedance in the cathode circuit of the output tube also causes local negative feedback within this stage.

Where possible, commercial types of components have been used throughout, and where failure is only equivalent to the failure of one valve, high quality components have not been used.

The gain of the amplifier measured

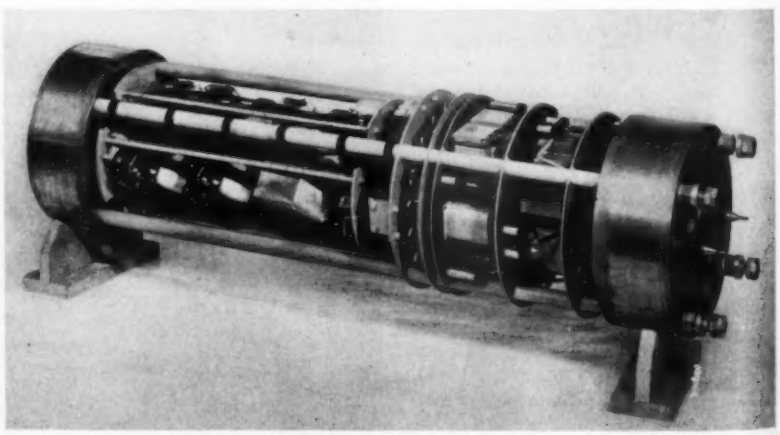


Fig. 3. Submerged repeater, inner assembly.

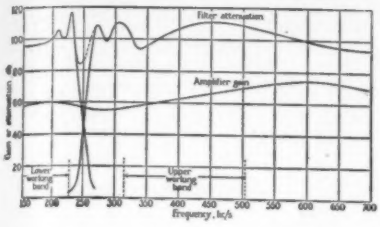


Fig. 4. Submerged repeater, filter losses and amplifier gain. The filters were designed for an upper working band of 276-472 kc.

between 52-ohm impedances is shown in *Fig. 4*. The Nyquist diagram measured between 52-ohm impedances is shown in *Fig. 5*, the moduli being in decibels. In addition, local negative feedback of the output tube amounts to at least six db in the working range and the margin of stability against oscillation is ample under working conditions.

Intermodulation, being mainly concerned with the output tube, is improved by about 28 db, due to the negative feedback. The gain of the output stage similarly is stabilized; that of the first two stages being stabilized by the main feedback only. Variation of gain with various tube combinations does not exceed ±0.2 db.

Intermodulation is confined to the amplifier by incorporating air cored inductors in the filters, and since the working frequency range is less than one octave, no second order products or third harmonics can cause interference between channels. The principal products liable to cause interference are third order difference products, and the quality of the amplifier in this respect can be tested at any time by transmitting frequencies of 360 and 420 kc. through the repeater so it is at equal levels in the output tube.

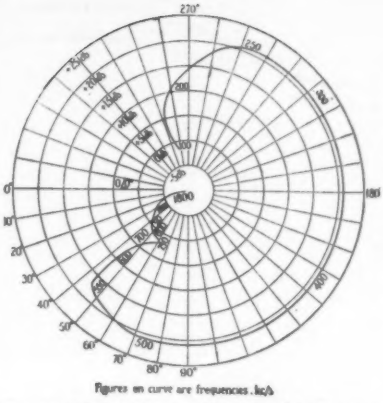


Fig. 5. Submerged repeater, Nyquist diagram.

A frequency of 300 kc. (2 x 360—420) is selected by a crystal filter at the receiving station. *Fig. 6* shows the magnitude of this product.

The overload point of the amplifier is about +21 db and the channel output can be +3 db or +8.5 db, according to whether American or British GPO data is used. The relative output level actually is 0 db so that ample margin exists for tube deterioration. At 504 kc, the minimum input level is —70 db, which gives a satisfactory margin against resistance noise.

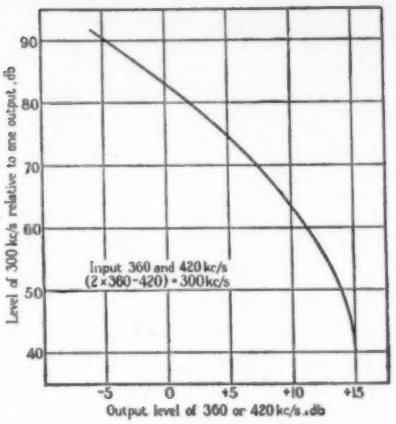


Fig. 6. Submerged repeater, relative level of third order modulation product.

Filter attenuation is shown in *Fig. 4*. The loop loss in the working range is at least 30 db, which corresponds to a deviation of ±0.25 db in the transmission characteristic. Outside, the working range 20 db is an adequate margin against oscillation. Distortion introduced by the filters in the working bands (about 1.5 db) is corrected by equalizers at the shore stations.

The first repeater was laid in June, 1943, but, unfortunately, failed after five months, owing to the failure of a filter condenser. The replacement repeater, at this writing, still is functioning.

>> *"Phone your friends from our gossip bench," began a New York department store's recent advertisement for a new piece of furniture.*

"This gossip bench is so inviting you will spend more time on the telephone," promised the advertiser.

Now if there is anything in the world women don't need, even in a gadget-minded postwar world, it is a gossip bench that is so comfortable they will spend more time on their telephones.

Without an upholstered gossip bench the women are addicted to half-hour or hour-long conversations without ever a pause to catch their breath.

And nothing can interrupt a woman who is in the middle of telephone gossip. "Just a minute while I go to the door," or "Hold on while I take a pie out of the oven," they say breathlessly.

Having to stand up and talk doesn't even bother these women. Look at the folks on rural lines who stand up to a wall telephone to gossip—to say nothing of all the other women on the line who stand up to listen in.

And think of the many times you have stood in line waiting to use a public telephone while a woman stood tirelessly and talked on and on and on. Or while she sat shut up in a cramped little booth for a 20-minute gabfest.

No, women don't need anything to make sitting at the telephone more comfortable. Heaven help the rest of us if the women who "visit" on the telephone ever find it a more relaxing occupation than they have in the past.—**Ruth Millet, Savannah, Ga. Press.**

Cops—But No Robber

A dog's bark over the telephone, a quick operator who notified the police, a speedy ride to the electrical shop in Brantford, Ontario, where the animal was employed as a watchdog, all should have added up to real drama. Instead, the canine was in the dog house and another false alarm was chalked up by the guardians of the law.

It seemed that the dog, new on the job, had tumbled the telephone off a desk and the noise of its falling startled him into audible protest.

BY FRANCIS X. WELCH

TELEPHONY'S Washington Editor

Welch reviews his ten predictions for the year 1945. . . . Goes on record with prophecies for 1946. . . . Does not expect rural telephone legislation to be enacted. . . . Quiet year predicted for FCC. . . . Expects little change in general rate levels. . . . Atomic energy might have effect on communications industry.

THIS is the first time in four years that this department can wholeheartedly wish all friends and readers a Merry Christmas and a Happy New Year. During the dark war years, the celebration of the birthday of the Prince of Peace had to be in the nature of a consolation—a little passing speck of brightness against the darkness of war and destruction which surrounded the world.

There must have been times during the past four years when even the most stout-hearted wondered if even this feeble light of hope finally might be overwhelmed. Today, we have our answer in the golden glow of victory and world peace. There should be a moral in this for all of us—never to sell civilization short. We need to keep this moral very firmly in mind, during these days of discussion about the atom bomb and other things, which the cynics say eventually may rid this weary world forever of the human race and all its stupidities. The moral is simply this: As long as the civilized races of the world will follow as best they can the precepts of the Prince of Peace they need have no fear of annihilation. With this fortitude in our hearts, the problems of reconversion, weighty as they are, should not seem too difficult—not after licking a double order of World War and crashing through into the atomic age.

* * *

Well, here we go again—the annual season for Prophet Welch to do his annual stuff about predictions of things to come for 1946. This is true, notwithstanding the recent congressional statute repealing excess profits.

But while we are dusting off the crystal ball and turning over rocks to see which way the worms crawl, and studying the flights of various birds and other mystical omens, let us run hastily over Prophet Welch's batting average for 1945. Maybe after glancing over that, you won't even want to read any further. Here, in somewhat condensed form, are the 10 predictions which your correspondent made one year ago, in this magazine, of things to happen in 1945:

(1) The Hill Bill to set up a Rural Telephone Administration would be introduced—but would not be passed—that a new bill to give similar powers to the Rural Electrification Administration (REA) would be introduced—and that it also would not pass, if enough people came out against it. (All these things happened in exactly that order.)

(2) Bills to rewrite the Communications Act and reorganize the Federal Communications Commission would be reintroduced and enacted in some form or other. (One-half correct. The bills were introduced but not enacted. The recently enacted Reorganization Bill does, however, give the President the *power* to reorganize the FCC.)

(3) Labor trouble would plague the telephone industry and become perhaps its No. 1 problem for 1945. (Check.)

(4) Manpower and material shortages would continue through the end of the German war, which was expected to happen in 1945. (Check.)

(5) A world-wide rise in agitation for nationalization of private industry, particularly public utilities, was predicted. (Check.)

(6) No rate increases but continued agitation for rate reductions. (Check.)

(7) Continued resistance in Congress to the administration on domestic policies. (Check — notwithstanding the change of administration.)

(8) A split in the Democratic party caused by the activities of the CIO Political Action group. (Check.)

(9) Some improvement but continued conflict between the state and federal regulatory commissions, with no federal legislation on the subject. (Check.)

(10) The Supreme Court would uphold the FCC in the hotel surcharge case but the FCC would lose in the New York Telephone Co. accounting case. (One-half right. The other half—the New York case—still in doubt as the court will probably wait until after the holidays to decide.)

On a percentage basis, that gives the old prophet a batting average of 900 or, if you prefer, 90 per cent, subject to 5 per cent adjustment either way when the New York Telephone decision is

handed down. That ought to be enough to keep your correspondent as a member, in good standing for one more year, of the Ancient Order of Prognosticators.

* * *

So here goes with 10 predictions for 1946:

(1) *Federal rural telephone legislation will not be enacted.* There will be some more agitation on the subject of allowing the REA to take over lending authority for rural telephones. One or more of the bills now in Congress to that effect may even get into the hearing stage. But the opposition in the telephone industry has so crystallized against the pro-public ownership provisions of these laws, and the sentiment in Congress has become so crystallized in favor of protecting private enterprise that this prophet simply cannot see it in the cards for such a law to get through with the President signing it.

(2) *The industry, itself, will make progress in rural telephony.* Last week we witnessed the announcement by REA Administrator Wickard of the first actual test of the carrier telephone among farm subscribers at Jonesboro, Ark. While this is still on an experimental basis, it shows that the industry is trying to solve the rural telephone problem, itself, so that there won't be any necessity for federal loan legislation. That is the way the thing should be settled. That is the way to protect the interests of the established telephone industry, both Bell and Independent. The prediction, therefore, is that during the coming year we shall see more of such announcements, not only with respect to the carrier telephone, but also farm radio-telephone experiments, and, more important, actual improvement of conventional wire rural telephone service on a commercial basis.

(3) *The FCC will have a quiet year.* Although its recent letter to the Senate Agriculture Committee, commending features of the proposed rural telephone legislation, shows that the FCC still is inclined to meddle in controversial telephone matters which are not strictly within its province, the commission, as a whole, seems to be settling down on a more conservative basis. Paradoxically, the appointments during the past year of younger men has grown to a controlling right wing on the commission which was previously mostly left. Furthermore, the recent enactment by Congress of a reorganization bill which would permit President Truman to put into effect (unless both houses of Congress disapproved within 60 days) a separate reorganization plan which might take away the FCC's independence, is likely to have the effect of making the commission lie low and do its home work for a while. This writer does not expect that the President will attempt any such reorganization since he will be much too busy with his broader reorganization plans, authorized by the same bill. Thus, for perhaps the first time since its hectic career began in 1934, the FCC, under the settling influence of its youthful chairman, Paul Porter, probably is looking forward to a hard working but peaceful 1946. That ought to be good news in a number of quarters.

(4) *Not much change in general rate levels.* In the general area of utility rate fixing, the year 1946 finds state commissions agitated by the fact that the removal of excess profits taxes may give rise to further demands for rate reductions. There is almost certain to be cases started along this line. Some voluntary reductions are likely to accrue. In other cases, utilities will try to show loss of earnings from the cessation of heavy war load and other circumstances which would justify a retention of utility rate levels.

Over the longer run—perhaps late in 1946—we even may expect the creeping inflation, already apparent on every hand, to bring forth more scattered demands for rate increases, particularly among the small Independent telephone companies which are suffering under present rate levels from increased operating expenses in the form of higher prices, materials, and higher wages.

By and large, however, this observer does not expect the general utility rate picture to change dras-

Bobby Sox

By Marty Links

"Wouldn't it be easier if you just went next door to talk to Ruthie?"

tically in 1946. The pressure for reduction in the early part of the year, already noted, is quite likely to be offset by the inflation pressure towards the end of the year. Only a better crystal gazer than your correspondent could attempt to say what the inflationary picture is going to be after that. But it is clear enough that if every item in the utility's operating expense, except perhaps taxes, continues to rise, rates certainly cannot go down, and may eventually even have to go up. There is not much mystery in that prognosis.

(5) *Kinder words for private enterprise.* We can expect more outspoken defense of public utilities during the coming year. As noted above, during the past year there was an internationally rising tide of public ownership propaganda which has had the effect of causing governments of foreign countries, notably Britain and France, to engage in wholesale nationalization of their public utilities. But there has been quite a noticeable reaction to this in the United States, where congressmen are beginning to realize that public utilities are only the first trench or bulwark in our system of free private enterprise. They are beginning to realize that American free enterprise is producing the dollars of tax revenue which we are lending foreign governments to nationalize their industry so as to engage in more intensive competition with American free enterprise.

Best evidence of this dawning consciousness of a vicious circle was in the version of the Full Employment Bill which the House of Representatives passed last week and will fight out in conference with the Senate. This bill transformed an original bill to place the responsibility on government (through "public works") to provide a job for every American, into a bill to protect private enterprise and sound fiscal policies and prevent government competition with private business. Whatever final bill emerges, it is significant to hear congressmen talk and think along those lines. We can expect more of the same as the year progresses.

(6) *The split between CIO labor politicians and the Democratic party leadership* will not be healed in time to do the Democrats too much good in the congressional elections in November, 1946. AFL and other more conservative labor leaders are trying to avert an open split which will almost surely elect a Republican House of Representatives and perhaps just miss giving the Republicans control of the Senate. If labor generally follows the advice of these wiser leaders, to get their affairs out of politics, the Democrats can make a closer battle. But right now the left wingers are racing in the direction of a third party — perhaps an American Labor Party, on a national scale. If this develops, we are likely to have in 1948 just the reverse of the Republican-Bull Moose split in 1912, which sent the major opposition candidate into office with plenty of votes to spare. But that is looking too far ahead. Let us just settle here for a Republican House in November, 1946, by a comfortable margin.

(7) *Technological effervescence.* We might as well make up our mind to it that the atom is here to stay—and not just a passing fancy on the part of some army scientists who wanted to give Japan the hot foot. When nine leading nuclear scientists state (as they did recently) that it would be possible to build a 100,000-horsepower generating station using atomic energy to compete with coal at $15 a ton within three to 20 years, we just can't dismiss the plain implications of the coming atomic age in all lines of industry, particularly public utilities.

Nothing tangible will result in 1946, except perhaps some more definite international agreement among the three leading powers to control the destructive aspects of atomic fission. But all through the year we will be getting recurrent discussions and announcements about possible applications of atomic energy to industrial and commercial use which are bound to affect the telephone business in years to come. Just to give one sample idea, a scientist speaking on a recent radio panel discussing atomic energy, said the main problem was not the utilization of the atom but the protection of human life and other industries from its rays. A small atom energy installation near a metropolitan city, unless protective devices are arranged, well might drive all radio and television programs right off the air in the local area. Maybe television will have to take to the buried coaxial cable for network relay, after all. In any event, we certainly can't have radioactive shenanigans like that going on in this country, on any scale at all, without having a terrific impact on our communications industries.

(8) *The labor issue.* It is an election year, so Congress will probably not enact drastic curbs on labor unions such as the Burton-Ball-Hatch Act to force compulsory arbitration in public utility or other essential industries. But Congress is sufficiently aroused to pass some lesser disciplinary legislation, such as the Hobbs Bill, to apply the anti-trust and anti-racketeering laws to labor unions and perhaps the "fact-finding" proposal of President Truman. There also may be enacted some legislation to make labor unions more responsible for enforcing their contracts.

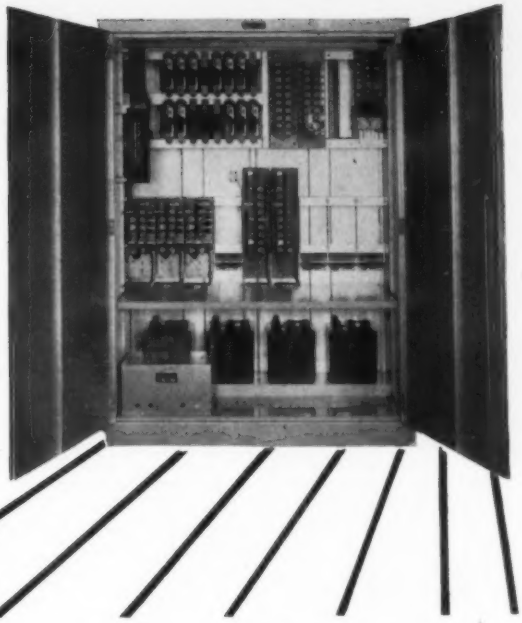
(9) *Discriminatory tax policy.* There will be a lot of talk about this, but Congress actually will do nothing about it in 1946. The fact that co-operatives and publicly owned utilities and other businesses now escape taxation, to a great degree, is rapidly becoming a national scandal—especially in view of the fact that they compete with business managed utilities and are supposed to set up yardstick rates. Congress has made a good start in requiring some publicity about the amount of federal income taxes which co-operatives (and, for that matter, labor unions) would have to pay if they were not exempt. But there will have to be a lot more talk and demonstration of tax evasion, as well as regulatory evasion, before Congress gets enough sand to tackle a problem filled with such political dynamite. It won't be in 1946.

(10) *Welch will not do as well forecasting for 1946 as he did for 1945.*

>> *Nothing great was ever achieved without enthusiasm. Enthusiasm is the power and health of the mind. It is youth, ambition, will. Man lives and is worthwhile as long as his enthusiasm lives. And when enthusiasm dies he dies—although he may not know it. What can we do to keep enthusiasm alive? We can talk to ourselves earnestly and determinedly, as we would to a man sitting dejected on the roadside. To him we should say: "Get up and walk on. You have every chance now that you ever had." Don't let the work you have done already go to waste. Don't moan over time wasted. Let the thought of that time drive you to use the time that remains.*

Hope goes but can be called back again. Enthusiasm dies out but it can be made strong again. Age is no bar to success if enthusiasm is there. Weakness does not prevent success if only the body is weak. It is weak courage that keeps men sitting down as failures when they should be going ahead, traveling the road.— **Arthur Brisbane.**

Attract New Income
Promote PABX's



There is a fine opportunity for every telephone company to realize additional income in the years ahead, by promoting the installation of Automatic Electric P-A-B-X's. The number of "live" prospects is large—including factories and business houses which are already "sold" on interior telephone service but have not been able to obtain installation during the last few years.

Automatic Electric P-A-B-X's provide the lightning-fast intercommunication these subscribers are looking for. And in addition they provide central-office trunk service on outgoing calls, and incoming service through an attendant (or if desired on some of the systems, this service can be provided without a regular attendant— an ideal arrangement for smaller organizations). Thus, the P-A-B-X is not only an interior telephone system, but a complete, coordinated system of telephone communications.

Your business subscribers will gladly pay the necessary rentals to secure this effective "streamlining" of their communications. Prepare now to attract new income through the promotion of Automatic Electric P-A-B-X's. We shall be glad to help you.

AUTOMATIC ELECTRIC

Originators and Developers of Stowger Step-by-Step Machine Switching Automatic Dial Systems
Makers of Telephone, Signaling and Communication Apparatus . . Electrical Engineers, Designers and Consultants

Distributors in U. S. and Possessions

AUTOMATIC ELECTRIC SALES CORPORATION, 1033 W. Van Buren St., Chicago 7, U. S. A.
Export Distributors: INTERNATIONAL AUTOMATIC ELECTRIC CORPORATION

STROWGER EQUIPMENT AT FORT WAYNE, IND.
The Home Telephone and Telegraph Company uses Strowger Automatic equipment in eight of its ten exchanges, including its headquarters in Fort Wayne. Through this equipment, it provides automatic service to more than 50,000 telephones.

The Known vs. The Unknown

STROWGER AUTOMATIC TELEPHONE EQUIPMENT was invented in the United States, and has been developed primarily to meet the traffic and service conditions in the United States.

STROWGER IS THE ONLY automatic telephone switching equipment manufactured for Independent telephone companies that has a long and highly successful record of operation in multi-office exchange areas as well as in single-office exchanges, large and small.

IT IS THE ONLY SUCH EQUIPMENT that has been in operation in the United States long enough, at a sufficient number of places and under such a variety of conditions that its record of costs affords a safe basis upon which to calculate such costs for the future.

FIFTY YEARS OF STROWGER OPERATION in the United States have removed Strowger costs and performance from the realm of speculation. Telephone companies do not experiment as to either of these things when they install Strowger.

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RURAL AND FARM TELEPHONE

Development in Virginia

By A. W. HARRISON
General Commercial Manager
Chesapeake & Potomac Telephone Co. of Virginia

NOW that the final victory message has sped across the wires, I think we can, without undue modesty, recognize the industry's war record as a source of mutual pride. The war's end was hastened because together we kept our telephone network — the very nerve system of the war effort—from breaking down. Company files are replete with official commendations from military authorities; GI Joe's morale and his estimate of our industry were elevated throughout the war, I believe, because of our unusual effort to take care of his personal telephone requirements. Your employes and ours made fine patriotic civic contributions through the Red Cross, War Bond drives and similar activities.

Yes, telephony's war record may be acclaimed but, because of it, we have inherited potent peacetime problems. In the Virginia territory we operate, 34,000 families anxiously await the long delayed installation of main service and there is a large backlog demand for various auxiliary services. Over 750 men must be reinducted from the armed forces and reoriented in the business. Plant margins and service quality must be restored. Personnel work challenges us as never before. With other industries, we face tax questions. And as we enter this postwar era, the trend of regulatory control engages our interest. We had a good war record but the fact remains that the public forgets easily and will be less tolerant with shortcomings in all industries now that the patriotic impulse has simmered down.

There are some symptoms that our postwar public may have a changing concept of industry's role in the scheme of things and this may be the place to start talking about a program to extend and improve farm telephone service. In any event, there is a certain amount of opinion inclined to the view that it is of special social, economic and other benefit to the nation that, in so far as possible, every farm have a telephone.

An outsider might ask why the industry is so "seemingly" suddenly alive to this issue. You are well aware that a good many statistics have been compiled—making unfavorable comparisons between the number of farms with telephones and the increase in electrified farms, which could be interpreted to indicate that the industry has not been alive to this issue. A close scrutiny of these statistics, however, could lead to the conclusion that they are perhaps incomplete in important instances, are silent as to depressed farm prices of the 1920's and the serious depression throughout the 1930's during which urban telephones also decreased sharply; that farms themselves have decreased 10 per cent since 1920 and despite this, fewer farms today are without telephones than since the turn of the century.

Nor can valid comparison be made with electrified farms and those with radios and automobiles. The telephone monthly charge is equivalent to about two gallons of gasoline a week, only a small fraction of the cost of the farmer's automobile, which these days is a basic necessity in his business and his family's pleasure; the telephone costs much less than the power so essential to operate water pressure systems, refrigeration for perishable products, coolers and separators for milk, the radio itself, household appliances and electric lights for the convenience of all. Yet the farmer has simply preferred these more costly things to the exclusion of the great value telephone service has for farmers—in neighborliness, in emergencies and in their business.

Senator Hill of Alabama introduced, in December, 1944, the well-known Rural Telephone Administration Bill providing for long term, low interest loans to individuals, municipalities, cooperatives, the REA, etc., for the purpose of financing the construction, acquisition, extension, and modernization of existing telephone companies as well as the creation, when necessary, of new organizations. Publicity accompanying this bill again pointed out the decrease in farm telephones since 1920, contrasting this decline with the extension of rural electricity which had increased in every state. You have been so well informed through the able analyses of this whole question in TELEPHONY that I will not labor it any further. Suffice it to say that it has been another factor in focusing the spotlight on rural development, *a movement already well under way prior to the war.*

Abundant evidence exists to prove that the industry has long been alive to the desirability of extending and improving farm service. This country has the highest rural telephone development in the world. There are fewer farms today without telephones than since 1900. The industry by aggressive action has increased the number of telephones on farms by 35 per cent since the depression's low point. The Bell System plans to extend service to another million rural homes within three to five years after men and materials are available, leaving for future development less than one-third of the farms in the Bell territory. I understand that the Independent industry has plans which, in the overall, run somewhat parallel to the Bell program.

Much of the discussion and all the potential legislation stem from statis-

tics basing farm development on the U. S. Census Bureau's definition of a farm, i.e., a tract of land of three acres or more devoted to agricultural purposes or less than three acres, providing there is a gross income from agricultural products of at least $250 per year. Included as farms are such units as nurseries, mushroom cellars, apiaries, cranberry bogs, greenhouses, as well as dry lot or barn dairies. If a land owner has one or more tenants, renters, croppers, or managers, the land operated by each is also defined as a farm. A fair appraisal must, therefore, take into account the dilution in rural development caused by such cases as telephones located in hamlets, country stores, service stations, and several tenants—not prospects—living on one large farming project.

Based on these census data, the per cent of farms with telephones in the United States was 34 per cent in 1930, 25 per cent in 1940, and 33 per cent *estimated* for 1945. The per cent of farms with power during the same periods rose from 13 to 33 to 45 per cent. It appears there are in the United States about 3,000,000 farms in connecting company territory and almost a like number in Bell territory, thus emphasizing that it is pretty much a problem for the industry as a whole.

In the Old Dominion, where there has been considerable speculation—politically and otherwise—as to the possibilities of extending both power and telephone service to more rural areas, census figures reveal there were in 1940 about 175,000 farms. Our estimates indicate that about 52,000 are in exchange areas of the Chesapeake & Potomac Telephone Co., 115,000 in connecting company territory and the few remaining in areas served by toll stations. In 1930, 17.8 per cent of Virginia farms had telephones and 15.0 per cent in 1940. Our detailed studies indicate that today about 25 per cent or one out of every four farms in the C&P territory has service. There are, of course, thousands of additional telephones in rural areas located in establishments not classified under the census' definition of a farm.

Farms decreased during 1920 to 1930 more than 15,000 and farm telephones about 3,000. A net of 4,275 farms resumed operation during the next 10 years but there was a decrease of 2.8 per cent in farms with telephones. We can partly explain this by the depression biting deeply into farm economy in the early 1930's. We know the telephone was the snowbound or mudbound farmer's chief readily available link to the outside world around 1920. When the depression commenced to lift about 1936, the telephone found itself in competition for the farmer's dollar with a whole host of modern improvements—a newer radio, farm machinery, rural electric power, and universal use of the automobile with vastly improved hard-surfaced highways. We might argue that telephone development is influenced by such factors as farm income, the per cent tenant-operated farms, the proportion of non-white farmers, and the level-of-living index, and demonstrate county by county across the state, that when and where farmers are receiving reasonably good prices, the percentage of farms with telephone is usually high, and that the converse is also true. We might cite the state planning board's statement that Virginia farms on the average produce products valued at $878 per year, compared with the average for the country of $1,309 and that raising the low agricultural income of the state is perhaps the fundamental problem confronting our economy in Virginia.

I believe it better business, however, to place emphasis upon the fact that while the number of farms decreased from 197,632 in 1935 to 174,885 in 1940, there was a net increase statewide of 3,500 rural telephone subscribers; further, that during the war period from 1940 to 1945, an additional increase of over 7,300 rural main telephones was realized. Industry wide statistics are difficult to obtain but, in the territory of the largest operator, the C&P of Virginia, *the percentage increase in rural telephones has been slightly higher since 1935 than the gain in urban telephones.* We had a real farm program which the war interrupted in 1941 and comprehensive planning again got under way in late 1944, which will culminate in positive action. The war may have slowed down but it did not completely stay the hand of research and planning.

What time we could spare in the C&P of Virginia over the past year has been used in getting ready to do our part of this job and you may be interested in a thumbnail sketch of our program. In the first place, engineering studies are being made to appraise the amount and type of central office, outside plant and other equipment required.

We are weighing the quality of service to the end that magneto lines may be converted to common battery or dial operation; reduction affected in the number of parties on the same line, selective ringing extended, better transmission assured, and special information service such as weather reports, bus and train schedules, movie showings, etc., may be provided as desired.

Our rate structures are being reviewed in detail. Practices governing construction charges on public highways and private property and other elements of cost to the farmer are being explored, including determination as to adequacy of local calling areas in meeting subscribers' requirements.

Market analyses are being made to determine in individual exchanges the number of farm and non-farm establishments, present and potential customers, whether a telephone or electric power line passes the premises, present condition of the line, sections requiring pole line construction, soil conditions and other pertinent data which we will use as the basis for engineering overall plans for the particular exchange.

We expect to put in readiness various publicity, promotional, and other steps designed to have those without service appreciate its value and understand the basis on which they can get it.

Rural line construction is being investigated to determine cheaper methods and looking to the preparation of fundamental rural line plans in particular areas. Revised arrangements with power companies and joint use of facilities are under study.

Attitude surveys are being completed to determine what the folks in rural areas think about telephone service, what they like and don't like about it, what they feel it should include, what improvements and new features would make it more pleasing and useful.

That there is an impending farm telephone expansion seems crystal clear. And it is equally certain that prudent management, which characterizes telephone companies, large and small—Bell and Independent—is vitally interested in how this important job can be done not only efficiently, but economically. I believe Clyde Bailey related the one about the fellow making money at poker being a gambler; at bridge being a social lion; at rendering rural telephone service, a miracle man! Well—at the risk of being the devil's advocate, I want to suggest several things that either have proved themselves, or offer some promise, in extending service at more reasonable cost to both the company and the customer.

First, powerful forces are at work to prove *this time* that if rural America prospers, this nation will prosper; if the farmer enters a period of depression, the nation will follow him. I recently heard an economist expound on such points as the rural population constituting 25 per cent of the consuming public—being the main raw materials source for all except the heavy industries—the seed-bed of human resources making it possible for the cities to replenish their populations. He talked about how eating is our basic need and

the farmer fulfills this need. Well, in Virginia, attention is certainly being focused on improving the farmer's lot and, if successful, perhaps the resulting increased service demand will make for more profitable operation of rural plant. The favorable effect of rural prosperity also should indirectly increase development in the urban areas.

This is rather theoretical and our immediate concern is with taking care of the growth already at hand as well as meeting the challenge to aggressively extend and improve the service—and doing both on a sound, businesslike basis. In accomplishing this objective, we can broadly classify the possibilities under such headings as: Approach to the job or programming; use of already available and better materials; labor-saving devices, and progress through research. Time permits elaborating upon these possibilities only in bare detail.

We are considering under "approach to the job," the feasibility of estimating, engineering, and constructing backbone rural plant so that our forces can handle projects on a combined basis rather than by small individual jobs thus using labor only once and having service ready when needed. To avoid returning to a job, wires strung might be those estimated to be required within one year rather than those immediately needed. Where there is no safety hazard, smaller wire stringing crews might be used on small isolated jobs. We might approach the job with the idea of securing more private right-of-way on favorable terms. This favors long spans, reduces tree trimming, avoids highway changes, and reduces guying requirements and power exposure. Joint use arrangements with power companies also argue, of course, for lower plant cost under certain conditions.

A brief recital of newer and more economical materials would embrace wider use of Class 10 poles — taking greater advantage of that high strength steel wire, first available in 1939, which permits long span construction and reduces by nearly one-half rural line building cost; using larger size poles rather than anchors at corners with less than 40 ft. pull, carrying less than 10 wires; employing, under proper soil conditions, rubber covered wire with wider use of the plow which, drawn through the earth by a truck, deposits the wire two feet below the surface in a single operation; installing very small dial switching units near groups of farms, giving the farm families more direct communication among each other and reducing the line wire investment to connect them to the closest exchange.

We might journey from a more efficient approach to the job and better materials to such labor saving devices as the small portable hole digger, about to be put on trial, capable of boring holes up to 16 ins. in diameter with lower priced labor; the new portable power saws for tree trimming; the gasoline power hammer for rock drilling. We can find customers willing to do some of the work to offset construction charges and sometimes economy results from local and contract labor for pole delivery, clearing right-of-way, hole digging and erecting poles. Doubtless, too, more efficient tools will be produced as we go along.

Some of these things may not prove practical and surely not all of them will be applicable under all circumstances. Their use and further development, in certain cases, are in the hands of the technicians for the most part. Our plant and engineering people say they are worth investigating, however, and adequate investigation should appeal to those of us who, as business men, are intent upon seeing the rural job done with efficiency and economy.

In connection with progress through research, you recall the FCC has been requested to make available 40 frequency assignments for 20 rural customer circuits with which to experiment with radio for rural service. But this is farther away from possible commercial usage than is power line carrier whereby a high frequency telephone current, carrying conversation, can "hitch-hike" a ride along an electric power line, hop off at the appointed spot and onto a pair of telephone wires running into the customer's premises. In addition to scientific refinements, there are now in process of solution interesting management questions concerning costs and proper use of this new development. This carrier system will be useful in extending our service to certain of those farms which are remote from existing telephone lines but are situated along existing power lines. Bell Laboratories will complete and make it available as soon as possible for use by telephone companies and service station organizations to extend service to more farms.

Speaking of service stations, we feel the service line contract has a definite place in our program. Some companies already make extensive use of this arrangement whereby the customers construct and maintain the line up to a point of junction with the company-owned circuit near the base rate area boundary, especially in isolated sections where it is difficult to justify the investment to reach the subscribers. Our program contemplates assistance to service line associations in a number of ways.

We have mentioned many items that will influence our financial operations. Before we can measure the ultimate effect on net return of rural and farm development, though, toll revenue must be considered. We made a recent study of 34 exchanges which indicated that a potential and fairly sizeable toll market may lie in rural areas. Monthly toll revenue per customer exceeded exchange revenue in 23 of the 34 exchanges. Toll revenue per account averaged slightly more than the exchange revenue. Toll revenue from farm telephones was higher in 12 exchanges than from non-farm rural stations. Only originating business was analyzed and a like amount of tolls may be placed *to* these rural stations.

I failed to mention the setting up of a canvassing organization in discussing our program but this will come in due course. My experience prior to 1941 points to the need for the farmer having a keener desire for service and creation of this desire is, in my opinion, of great importance. In 1939 and 1940, we put on entertaining and instructive shows in schools before large audiences, dramatized the telephone's value and usefulness—its indispensability at times, gave away souvenirs, then turned loose our salesmen, yet still some difficulty was encountered in selling certain likely prospects.

The telephone makes the wheels of rural business turn more efficiently, more dependably and more economically; makes every rural home with service a more comfortable, a more convenient, a safer and a more pleasant place in which to live. When emergency arises, often only the telephone can summon aid fast enough from the doctor, or the police, or from the town fire squad or maybe from some neighbor who can help. Often overlooked are the time and auto expense to be saved by taking telephone trips to town; how feelings of loneliness vanish when some friend is telephoned; the fact that a simple call can post farmers on happenings in town and in the far corners of the county.

When the farmer fully appreciates these things, when he develops the habit of ringing up a neighbor when his cattle have overrun the pasture, or of a voice trip to the stores, or just to chat when the weather is bad, or to call a neighbor or the market to sell vegetables or something else he has raised, then we can have a rural and a farm telephone development in Virginia in which all concerned can take pride.

[The foregoing is an address presented before the recent Virginia Independent telephone convention.]

THE PLANT MAN'S NOTEBOOK

BY RAY BLAIN • TECHNICAL EDITOR

RECENTLY we had the pleasure of inspecting and testing a new tool designed to remove the lead sheath from paper insulated telephone cable. This tool combines features of the wrench and pliers. It first is sized to the cable with an adjustment screw in one of the handles. The cutting blade then is let down and set to a depth equal to the thickness of the sheath. The tool is swung around the cable in a manner similar to a pipe cutter which rings it, and the blade then is turned at right angles to the tool and pulled along the cable to slit the sheath between the two places where the rings are cut. Two cuts in this manner and the sheath comes out in two pieces, leaving the conductors bared neatly for splicing.

There is every indication that this tool does a neat, clean job without damage to the conductors. The only doubt in our minds is whether splicers will use it, or if they will continue to use the chipping knife and a pair of snips.

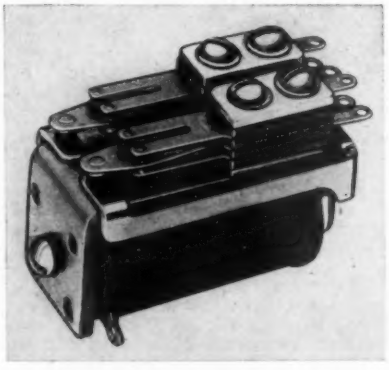
* * *

A large eastern railroad now is conducting tests of recorders on its information telephones. Patrons frequently complain they were advised over the telephone that a train was 30 minutes late when actually it arrived on time. The personnel in the information service claims it did not give out erroneous information and the railroad officials are prone to agree with this statement inasmuch as full train information always is available to the clerks.

Certainly, recorder monitoring of these lines should solve this problem. If the customer is guilty of the mistake, a play back of the recording will convince him of that fact and thereby should improve public relations for the company. On the other hand, if the employe is at fault, effective proof is at hand, and, by the use of this method, future similar misunderstandings are avoided.

* * *

The new midget type of telephone relay weighs only 1¾ ozs. but is sturdy as well as compact, and is designed to long, precise performance under exacting conditions. The length over-all is 1¼ ins. x 1$\frac{7}{32}$ ins. high x 11/18 ins. wide. It is sensitive enough to operate



on minute current, but the design incorporates twin contacts so that high contact pressure creates perfect closure. These relays can be built to specifications to withstand 200-hour salt spray tests and can be tropicalized properly.

* * *

The other day, while the writer was discussing telephone maintenance problems with several engineers, the statement was made that a record of troubles on station line record cards was not considered worthwhile. This statement resulted in a variance of opinion.

It would seem there are various good reasons for keeping an accurate record of troubles on individual lines and stations. For example, in the event of a service complaint, definite information would be available as to just when trouble occurred and how long the service was interrupted. Also, an analysis of past troubles often indicates a weakness in the plant which can be corrected and trouble reduced accordingly. We would be pleased to receive comments from our readers on this subject.

* * *

The rhombic antenna is a favorite among engineers for radio-telephone reception. To fully utilize its high gain, a wide hand impedance matching device must be used between the antenna and the coaxial line leading to the receiver. A special coupling transformer has been designed to perform this function with a minimum loss over the frequency range, four to 22 megacycles.

The electrical elements of this coupling transformer are enclosed in a weather tight, cast iron housing, which is mounted on the pole supporting the input ends of the antenna wires. The two antenna leads connect to the steatite insulator bushings, and the coaxial cable is brought into the box through a metal bowl in the bottom.

Electrically, the unit consists of a radio frequency transformer using iron core material of high permeability to obtain the desired broad band frequency response. Through careful engineering design, the unit transforms the 700-ohm balanced antenna impedance to the 70-ohm unbalanced impedance required to match the transmission line.

* * *

There recently has been developed a non-breakable phonograph record for home use. This new record is a flexible disc made of a synthetic plastic material that reduces greatly surface sound, is easy to handle and more attractive. It is ruby red and transparent and can be hurled to the floor, hammered against, bent or twisted without damage.

PACIFIC INDEPENDENTS PROTEST RURAL BILLS

PROBLEMS of small company owners, rates and rural service received the attention of the Pacific Coast Telephone Committees on Intercompany Settlements and Rural Service at a meeting held in Seattle, Wash., November 12 to 15. The committees, representing the Oregon, Washington and California Independent Telephone associations, made many important decisions on current action and general policy.

The committee on rural service decided that the records of the Senate Committee on Agriculture and Forestry should contain the protest of the Pacific Coast Independent associations against consideration of rural telephone legislation. Such a protest was made timely by Secretary of Agriculture Clinton Anderson's letter of October 24 to Sen. Elmer Thomas, chairman of the Committee on Agriculture and Forestry, in support of this legislation. (TELEPHONY, November 17, page 16.)

Secretary Anderson's letter recommended that Senator Thomas' committee report favorably on Senate Bill 1115 which is the so-called Hill Bill. This bill would provide for federal financing of rural telephone developments with the program to be administered by the existing Rural Electrification Administration.

The arguments of the Pacific Coast Independents in opposition to the Hill Bill have been placed on record with the Senate committee through a letter addressed to Senator Thomas dated November 26 and signed by Secretary J. T. Naylor for the Pacific Coast Independent Telephone Committee on Rural Service. Copies of the letter were also forwarded to Secretary Anderson and to Independent companies in the Pacific Coast territory.

Stating that the committee believes the Hill Bill to be contrary to the best interests of present and future telephone users and to be an ill-timed rejection of the achievements of the telephone industry in the United States, the letter to Senator Thomas urged that further consideration of such legislation be discouraged.

Commenting upon Secretary Anderson's letter of October 24 to Senator Thomas the committee's letter stated:

"Isolating certain broad nationwide statistics to prove the necessity for rural legislation as was done in Hon. Clinton Anderson's letter of October 24, 1945, addressed to you, fails to recognize where present rural telephone development has come from or where it is going. In letting these figures speak for themselves, without searching out and stating the significant influences which have brought about changes in rural development and influences which will continue to bring about changes, an erroneous and unfair inference is made that the telephone industry has failed to meet its obligations in the rural areas.

"Honest and unbiased usage of these figures would state that they reflect a major economic depression climaxed by a major war and little else. Even if the misrepresentations were not admitted and that statistical argument presented could be accepted, the conclusion which is drawn therefrom to the effect that money should be poured into rural telephone service does not follow logically; as a matter of fact, it can be shown that responsibility for diminishing rural development particularly among mutual and cooperative organizations has been attributable not any more to lack of funds than to lack of management, lack of knowledge of the telephone business, and lack of essential measures to protect investment.

"Permanent high-grade telephone service cannot be the result of arbitrarily providing money but can only come from expert maintenance, proper depreciation and investment accounting, proper original construction and proper financial and economic administration. The only machinery which has proved successful in the past or shows any promise of being so in the future in furnishing all of these essentials of permanent telephone service is a complete, expertly-staffed, thoroughly departmentalized telephone company.

"From the contacts which have been made with the public in the Pacific area to ascertain its sentiments in connection with the government getting into the telephone business, we invariably have encountered opposition to the plan. Those who have had experience with mutual cooperative telephone operations have convinced themselves of its futility. Management and responsibility is not sufficiently fixed and centralized to protect an investment; any so-called self-liquidating loan to mutual companies over a 35-year period is, in effect, outright government subsidy.

"If past typical results of mutual operations are acceptable as indications of future performance, the depreciation and poor maintenance would consume the loans without any possibility of the business achieving solvency; to keep service going the whole wasteful process would have to be duplicated long before the 35-year maturity date arrived.

"Secretary Anderson, in accrediting the Rural Electrification Administration for increased electrical development in rural areas, fails to segregate the proportion of this increase which was accomplished by private electric companies. The impression is conveyed in the Secretary's letter as well as in the Hill Bill itself and in companion bills pending before the House of Representatives that the advocates of rural telephone legislation are plunging arbitrarily at conclusions dictated by their own prejudices without caring to select or to analyze their figures fairly or to apportion credit or blame where it is honestly deserved. . . ."

Commenting upon the superiority of telephone communications in the United States as contrasted with telephone communications in other sections of the world, the committee letter stated: "There is every reason to believe that this supremacy will be perpetuated into the indefinite future so long as favorable economic environment for our industry is permitted to exist."

The letter expressed the committee's belief that a thorough and factual investigation of the telephone industry's willingness and ability to meet any practical situation, including that created by demand for rural telephone service, would produce justification for listing it among "the last of the industries in the United States which requires 'crutches' at the expense of the taxpayer or any governmental agency."

Commenting upon the fact that comparing telephone service requirements with demand for electric service without considering differences between these two types of service presents a picture which also insinuates deficiencies in telephone development which are unreal, the letter stated:

"The inference of agitation for rural legislation is that telephone service is inherently a universal service and that like electricity and fuel it is essential to the well being of *all* residences and businesses.

"We in the telephone business only wish this were true but we know very well that it is not the case. Though we hope and expect that in the future higher percentages of telephone development than ever before may be realized, anything like 100 per cent coverage is not anticipated. . . .

"It is necessary to distinguish between the degree of urgent demand felt by farm residents for electric service and the degree of demand for telephone service. The fact is, as you may know, there are hundreds of thousands of people today living within stone's throw of excellent telephone service offered at very reasonable rates who simply don't want telephone service. . . .

"Those people who want and need telephone service are willing to pay the reasonable costs for the service and have as their first and most important question, 'How permanent and how dependable will the service be?' The American telephone industry has built

its reputation for prompt and reliable service by dealing with the millions of such people who are our present users.

"Except through misrepresentation or misinterpretation of statistics no evidence has been offered to demonstrate that the industry has failed to satisfy every reasonable demand or that the public or the farmers in general are appealing for any new agencies to handle their problems. As has been said earlier, our industry has been equal to the tasks with which it has been confronted and in a moment I shall list for you the specific measures which are being taken currently by this committee and by many other groups similarly constituted throughout the nation to ascertain that there shall be no letdown in meeting every service challenge.

"It is very easy at this particular time to find excuses to crusade against the shortages being felt in all fields. The telephone industry has shared with all other industry, and we believe to an extent far greater than the average, the sacrifices imposed by the greatest war in the nation's history. Victory has been a tremendous satisfaction but it has cost a terrific price. One of the costs has been to make telephone service the poorest, by comparison with its immediate prewar quality, in our industry's history.

"Our having gladly and voluntarily diverted all possible material and manpower to our gallant Army Signal Corps, Navy and Marine Corps so they might have all the 'stuff' they needed to do the magnificent job which is now history has rendered facilities to handle current service requirements entirely inadequate.

"Even at this low ebb of things telephone service in this country today is superior to service enjoyed by other nations when times were at their very best. . . .

"If three or four years from now when telephone instruments, switchboards, wire, cable and other materials are plentiful and have been delivered in the necessary quantities these advocates of rural telephone legislation can offer persuasive argument against the adequacy of the private telephone companies in meeting rural service requirements, then the interest of government or some third party may have justification. In the meantime, however, we believe it to be an inalienable right of the telephone business, as it is with all other industries in the United States, to recover from the strain of war and attempt to serve all needs."

The committee letter pointed out to Senator Thomas that the telephone industry has been at work diligently for many months preparing to expand and improve rural telephone service on a sound and permanent economic basis and urged that the industry be given a chance to give effect to these plans and efforts without "the duplication, complications and interference which governmental encouragement of public-financed telephone service would constitute."

Stating that the industry's programs have and will prove sound and timely and that the current program of the committee and its constituent companies is paralleled by most of the telephone companies and associations throughout the United States, the committee letter listed the six general goals of its current program:

(1) To expedite proper financing of all telephone companies large and small.

(2) To develop maximum service consciousness and disseminate knowledge of rural construction data to all companies serving rural areas.

(3) To bring about maximum liberalization of line extension policies and rural and suburban rate plans consistent with sound economy.

(4) To encourage the modernization of equipment rendering telephone service.

(5) To develop practical techniques and commercial arrangements for the usage of telephone carrier equipment on power lines.

(6) To develop practical techniques and commercial arrangements for the usage of radio-telephone service.

In closing its appeal for a recommendation from Senator Thomas's committee that Senate Bill 1115 or any other legislation similarly intended be withheld from further congressional consideration, the letters stated: "Legislative action at this time would be most untimely as well as being unfair both to the public and to an industry which has provided this nation with a grade of communication service unparalleled elsewhere either in quality or in quantity."

COMING CONVENTIONS

Minnesota Telephone Association, St. Paul Hotel, St. Paul, January 28, 29 and 30, 1946.

Kentucky Independent Telephone Association, April 4 and 5, 1946. No hotel named as yet.

Nebraska Telephone Association, Paxton Hotel, Omaha, April 9 and 10, 1946.

Iowa Independent Telephone Association, Ft. Des Moines Hotel, Des Moines, April 11 and 12, 1946.

United States Independent Telephone Association Executives' Conference, Edgewater Beach Hotel, Chicago, April 16 and 17, 1946.

Ohio Independent Telephone Association, Deshler-Wallick Hotel, Columbus, April 23 and 24, 1946.

Indiana Telephone Association, Severin Hotel, Indianapolis, May 1 and 2, 1946.

Illinois Telephone Association, Pere Marquette Hotel, Peoria, May 8 and 9, 1946.

Wisconsin Independent Telephone Association, Park Hotel, Madison, May 14, 15 and 16, 1946.

New York State Telephone Association, Hotel Onondaga, Syracuse, May 22 and 23, 1946.

Pennsylvania Independent Telephone Association, Lawrence Hotel, Erie, June 4, 5 and 6, 1946.

Michigan Independent Telephone Association, September 18 and 19, 1946 (tentative). No hotel named as yet.

United States Independent Telephone Association, Stevens Hotel, Chicago, October 14, 15 and 16, 1946.

YOUR BEST INVESTMENT—VICTORY BONDS

Bring Our Boys Home—
Provide Hospital Care—
Prevent Inflation!

Don't Stop Now—Follow Through!

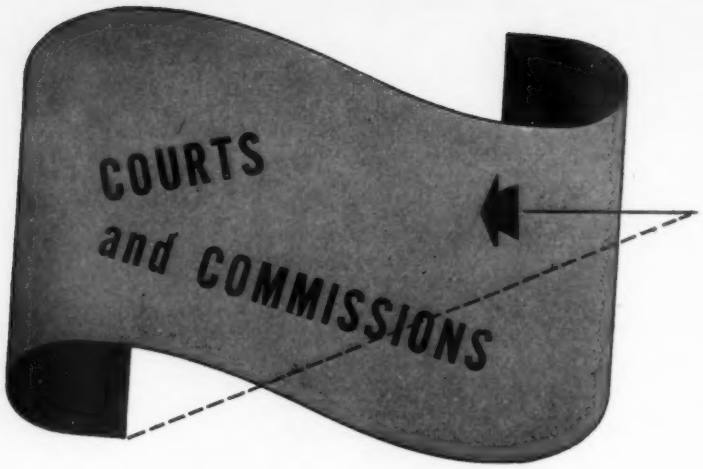
Oklahoma Association Elects Directors

Following a decision of the executive board of the Oklahoma Telephone Association that the annual convention be dispensed with, election of directors for 1946 was held by mail ballot under supervision of the nominating and election committees.

Directors elected were: V. S. Reynolds, Waynoka; Forrest Hand, Beggs; Endsley Jones, Kingfisher; J. M. Nelson, Skiatook; A. G. Davidson, Brownwood, Tex.; John W. Holt, Stillwell; Warren S. Miller, Oklahoma City, and W. T. Autrey, Broken Arrow.

Spain to Pay IT&T

International Telephone & Telegraph Co. will receive an initial payment of $2,000,000 from the Spanish government as amortization of its holdings of $50,000,000 of Spain's 4 per cent United States dollar bonds, it was recently announced. These were required by the telephone company under the terms of the sale of the Spanish Telephone Co. to the government for $80,000,000. (TELEPHONY, March 31, 1945, page 27.)



Bell and Independent Announce Rate Reduction

Telephone calls to and from Fishers Island, N. Y., from Westerly and Watch Hill, R. I., and Mystic, Niantic and New London, Conn., were reduced from 25 cents plus tax to 10 cents plus tax, for the first five minutes, effective December 1, the Southern New England Telephone Co. and the Fishers Island (N.Y.) Telephone Corp. have announced.

Rates from other mainland points to the island are five to 30 cents lower, it was reported, depending on the mileage. The new rates will be computed on the standard airline mileage basis.

A special charge on each call originally was applied to cover the costs involved in the installation and maintenance of the necessary submarine cable connecting the island to the mainland at Groton Long Point. The elimination of this charge reduces telephone income approximately $6,000 a year.

V V

Seek Permits for Auto Radio-Telephone Stations

The Illinois Bell Telephone Co. recently filed applications for permits to build highway radio-telephone stations that would provide two-way service to drivers between Chicago and St. Louis, Mo.

The company already holds a permit to build a transmitter for an experimental urban vehicular service station covering the Chicago metropolitan area. It is expected this transmitter will be built sometime next spring. The company also has been participating in a trial mobile marine radio service for lake shipping.

These experiments, using frequency modulation, have been conducted with a 60 watt transmitter atop a building in Chicago's loop. Data is now being collected regarding the range and effectiveness of this service, which, it is expected, may appeal to yachtsmen and the owners of small pleasure craft as well as bigger lake vessels.

The company's highway service applications call for transmitters to be built in Chicago, Ottawa, Peoria, Springfield, and St. Louis. The company expects that radio-telephone service will appeal particularly to trucking interests, salesmen, and others using the highways regularly.

As projected, the highway, urban, and marine services would enable the operator of any car, truck, boat, or barge to be connected with any telephone in the Bell System through the combined use of radio and telephone lines.

More than 75 companies using fleets of cars and trucks already have expressed desires to become subscribers to the urban service, the Illinois Bell has revealed. Nearly 50 other firms have shown varying degrees of interest. Armored car, ambulance, pickup and delivery services and physicians are among those who have expressed eagerness to use the projected system.

V V

Canada to Regulate Telephone Calls to States

A new Canadian law known as the Extradition Act prohibits telephoning "from within Ontario to any residents within or outside Ontario for the purpose of trading in any security with any member of the public."

The words "outside of" are new and make a great difference in administration. Exceptions are made for telephoning to a close personal friend, a business associate or a customer with whom the telephone has been used in trading in securities which are not exempt from registration.

When a person has requested in writing information respecting any security, telephoning is permitted with reference to that security alone. Telephoning also is allowed in the case of securities which are exempt from registration.

V V

Curbs Posting of Bills On Telephone Poles

In an effort to curb the posting of election bills on telephone poles, the city clerk of Vancouver, British Columbia, recently was instructed to notify organizations sponsoring political candidates that the practice is against the law.

Corporation Counsel D. E. McTaggart said that apparently it was necessary to catch a billposter in the act in order to secure a conviction, but he thought a test case against the candidate whose picture appeared might be started on the assumption that the man in the picture must bear some responsibility.

V V

Rate Increase Granted Oklahoma Company

The Oklahoma Corporation Commission recently granted application of the Hammon (Okla.) Telephone Co. for increased rates on certain classes of service over city lines, but withheld action on the company's application for increases on rural service pending action of the company in making certain improvements in that service. (TELEPHONY, November 17, page 26.)

New rates authorized by the commission are: Business, one-party, increased from $2.50 to $3.00; business, two-party, from $2.25 to $2.50; residence, one-party, from $1.50 to $1.75; residence, two-party, from $1.25 to $1.50.

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FWD Trucks are engineered and built with four-wheel-drive power, ruggedness and reliability to "take in stride" all the tougher-than-usual line construction and maintenance jobs utilities encounter under war conditions.

The value of FWD's true four-wheel-drive principle with center differential is emphasized by the extreme demands of "the duration." More than ever before utility men rely on their FWDs — their all season, all year performance — their superior "going power" and stamina for dependable transport of men, materials, and equipment in the vital job of maintaining power and communication lines of the nation at war. Write for the FWD Utility-Truck Bulletin.

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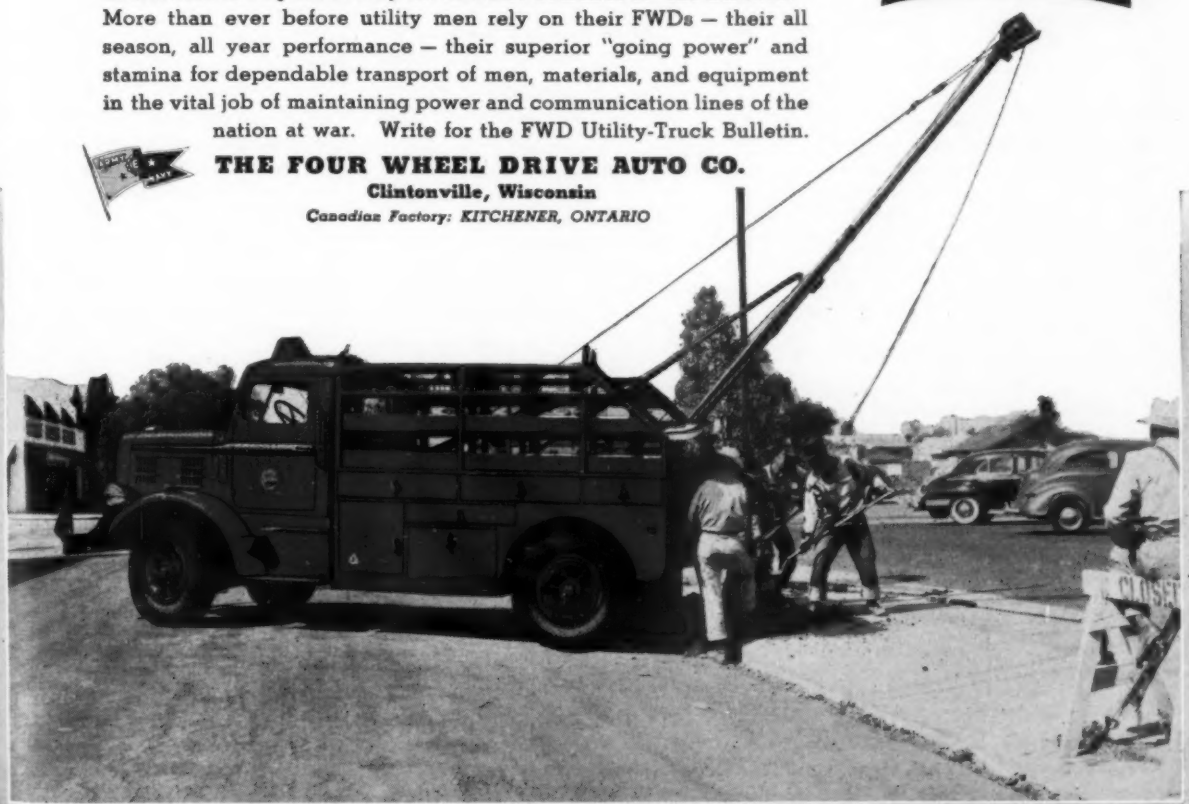
THE FOUR WHEEL DRIVE AUTO CO.
Clintonville, Wisconsin
Canadian Factory: KITCHENER, ONTARIO



Rebates and Rate Slash Ordered for Michigan Bell

The Michigan Public Service Commission on December 14 ordered the Michigan Bell Telephone Co. to rebate $3,500,000 to its customers for each of the years 1944 and 1945 and to reduce its rates for 1946 by a similar amount. (TELEPHONY, December 1, page 28.)

The $7,000,000 rebate ordered for 1944 and 1945 was primarily to avoid excess profits tax liabilities while the order for 1946 was based on the contention that the company's rates were unreasonable, the commission said. The company was instructed to submit a plan within 15 days for distribution for the rebates for 1944 and 1945.

V V

Thomas E. Sheard Buys Two Oklahoma Exchanges

Thomas E. Sheard has purchased the telephone exchanges at Salina and Spavinaw, Okla., from E. D. Simpkins, manager of the Coryell Telephone Co., Jay, Okla. For the past four years Mr. Sheard has been post signal officer at Camp Crowder, Mo. Prior to his military service he was for 17 years employed in the plant department of the Southwestern Bell Telephone Co., Topeka, Kan.

The Salina and Spavinaw plants now have 42 subscribers, but Mr. Sheard expects to improve and extend service in the two towns.

V V

Summary of Commission Rulings and Hearings

California Railroad Commission

November 30: Amendment to original application filed by Pacific Telephone & Telegraph Co., San Francisco, and Southern California Telephone Co., Los Angeles, for authority to modify present directory listings.

November 30: Answer filed by Southern California Telephone Co. to charges of Albert J. Amateau, doing business as Ajax Secretarial Service.

November 30: Dismissed complaint of California Northern Hotel Association and San Francisco Hotel Association against Pacific Telephone & Telegraph Co.

Illinois Commerce Commission

December 19: Hearing on petitions of Illinois Bell Telephone Co. for approval of amendments covering lease of certain telephone facilities at Joliet, Springfield, Ottawa and Peoria from American Telephone & Telegraph Co.

Kansas State Corporation Commission

November 19: Heard and advised application of Farmers Cooperative Telephone Association for certificate of convenience and authority to do business in Smith County.

November 19: Heard and advised application of Farmers Mutual Telephone Co. to transact business in Gaylord and Cedar, Smith County.

December 18: Hearing on application of C&M Telephone Co. to cease operating at Madison and adjacent territory.

December 18: Hearing on application of Madison (Kan.) Telephone Exchange for certificate of convenience and authority to do business at Madison.

January 7, 1946: Hearing on application of Fairview (Kan.) Telephone Co. for authority to make rate changes.

January 7, 1946: Hearing on application of German-American Telephone Co., Victoria, to make rate changes.

Oklahoma Corporation Commission

December 26: Hearing continued on application of John Crosland, Britton, for district service through Oklahoma City exchange of Southwestern Bell Telephone Co.

December 30: Hearing on application of Fred Barrett to require Oklahoma Automatic Telephone Co., Kiowa, to restore general service and improve present service at Clarita.

December 30: Hearing on application of Stephens Petroleum Co., to require Cyril (Okla.) Telephone Co. to furnish "reasonable and adequate service."

January 15 to 18, 1946: Hearing continued on application of Southwestern Associated Telephone Co., Lubbock, Tex., for rate increases at 27 Oklahoma exchanges.

February 20, 1946: Hearing continued on application of Farmers Mutual Telephone Co., Weatherford, for authority to make additional charge of 10 cents on long distance calls through Southwestern Bell Telephone Co. at Weatherford.

Wisconsin Public Service Commission

December 18: Hearing on application of Boscobel (Wis.) Telephone Co. for authority to buy property of Sanders Creek Telephone Co. for $400 and apply its rates there.

V V

AT&T to Construct New Radio Relay System

A series of the newest type of microwave radio relay stations, designed to handle television, sound radio programs, or long distance telephone calls, is to be constructed between Chicago and Milwaukee, the American Telephone & Telegraph Co. recently announced. The Long Lines Department of the company has filed applications with the Federal Communications Commission for authority to build and operate this super high-frequency radio relay system on an experimental basis.

Such systems are expected to play an important part in future communications in combination with the nationwide network of coaxial cables now under construction. At the present time another radio relay system is being built between New York and Boston. It is probable that Bell System television networks will consist of interconnected coaxial cable and radio relay channels.

The Chicago-Milwaukee system will be completed prior to the time when Chicago is expected to be linked by coaxial cable with cities on the eastern coast where intercity television transmission over coaxial cable has already taken place. On December 1, television of the Army-Navy football game was transmitted successfully via coaxial cable between Philadelphia and New York. Starting in January, regular scheduled television programs will go over Bell System cables from Washington to New York.

The Bell System's construction program calls for the addition each year for the next few years of upwards of 1,500 miles of the coaxial type of cable.

The radio relay system between Chicago and Milwaukee, which will cost about $500,000, is expected to be ready for tests in the spring of 1947. It is planned initially to employ this system for television transmission in cooperation with television Station WMJT in Milwaukee or with any other broadcaster who might be able to use the facilities during the experimental period. The early experiments will be on frequencies in the 4,000-megacycle range.

The terminals for the system will be at the Illinois Bell Telephone Co. long distance center in Chicago and at the Wisconsin Telephone Co.'s toll building in Milwaukee. There will be three radio repeater stations along the way: One near Barrington, Ill.; another also in Illinois but near Wilmot, Wis., and the third in the vicinity of Prospect, Wis.

The stations will be spaced about 25 miles apart. Because microwaves travel along a line-of-sight path, high antenna towers are required so that the radio waves will not be obstructed either by hills or buildings. At the center of a 25 mile path, the earth's curvature amounts to about 104 ft. Along the Chicago-Milwaukee route, the terrain is fairly level, so that station antenna towers about 120 ft. in height will insure sufficient clearance for the straight-traveling microwaves. A building will be erected at the foot of each tower to house the power and other equipment needed.

V V

OBITUARY

J. J. RYAN, one of the founders of the Geneseo (Ill.) Co-operative Telephone Co., died of a heart attack on November 26. Mr. Ryan served as a director of the Geneseo company for 20 years and was for many years its president.

At 82, Michigan Independent Man Handles Switchboard

At 82, John J. Walker, pioneer businessman of Emmett County, Mich., handles the switchboard of the Levering (Mich.) Telephone Co. which he founded in 1897.

Also proprietor of the Walker & Sons' store in Levering, Mr. Walker hears perfectly and does not wear glasses. He refers to himself as the "Sunday operator."

The company uses the switchboard which it obtained 45 years ago.

In 1888, Mr. Walker started a small store in the Levering Hotel, and in 1890 established the general merchandise business which is still in operation in Levering. The store is also the home of the telephone company.

At one time, service was supplied to points as far as 22 miles from Levering, but now the lines extend only seven miles. Mr. Walker's son, Charles, 46, does the installation and repair work for the 62 subscribers. Service is stopped at night except for emergency calls, which are handled by the son from his apartment above the store.

V V

Commercial Superintendent at Central Missouri Company

Vernon Allan recently became commercial superintendent of the Central Missouri Telephone Co., Warrensburg. He recently was discharged after three years' service in the Army Air Corps where he held a commission as first lieutenant and was an instructor in aerial navigation at San Marco, Tex.

Mr. Allen was employed by an affiliate of the Central Missouri Telephone Co. in North Carolina for three years as commercial manager before his induction.

Best Story of the Week—What's Yours?

The tip came into the Chicago Ave. Police Station, Chicago, by telephone.

"There is a big wire room in operation at 661 N. Dearborn St.," a voice said. "It is full of busy telephones."

To Capt. Kyran V. Phelan and other police a "wire room" is a place to which bets on horse races are telephoned. The captain and a squad of detectives dashed to the scene.

They found the wire room at that address, all right—three exchanges of the Illinois Bell Telephone Co.

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MADE BY:
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The best quality cross-arms you can buy.

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RELIABLE TEST CLIPS

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ALABAMA INDEPENDENTS HOLD 2-DAY CONVENTION

By EARL McDONALD
Secretary, Alabama Independent Telephone Association

THE Alabama Independent Telephone Association held its annual meeting at the Jefferson-Davis Hotel in Montgomery, Ala., November 19 and 20. A splendid program was planned and the meetings were well attended. It was the consensus of opinion that the meetings were more informative and interesting than any ever held by the association during its history.

The first speaker, W. C. Henry, president of the United States Independent Telephone Association, delivered an oration that should have gone down in history but for some cause, yet unexplained, a copy of the manuscript was not obtained. Among other things Mr. Henry gave an excellent word picture of two immediate problems confronting the industry, rural telephone development and wage-hour legislation. It was the opinion of attending delegates and visitors that the address did have, and will continue to have, a sobering effect on these issues.

Mr. Henry was followed by Hon. Gordon Persons, president of Alabama Public Service Commission and co-sponsor of the Hill Bill, which would provide federal government financing of rural telephone expansion and construction. Mr. Persons spoke on "The Necessity of Rural Telephones."

After lunch B. C. Burden, communication and electrical engineer of Lincoln, Neb., discussed the potential uses of rural power line carrier channels, the field of use of radio systems in small exchanges, the effect of new plant developments on the Independent exchange, and toll dialing. The motion picture illustrations, together with Mr. Burden's ability to express himself in simple, everyday language, made the discussion of these technical subjects interesting and helpful to his listeners.

F. M. Malone, Alabama manager of the Southern Bell Telephone & Telegraph Co., discussed "Problems Confronting the Telephone Industry Today," and John M. Ward, executive secretary of the Alabama State Chamber of Commerce, talked on the "Industrial Developments in Alabama."

Since most of the Alabama membership is made up of small exchange operators, it was particularly interested in the concluding address, "Converting the Small Exchange to Mechanical Switching" by H. M. Stewart, owner of the Standard Telephone Co., Cornelia, Ga. Mr. Stewart is a small operator who thoroughly understands the problems of small company operators.

An added feature of the program was a joint traffic conference between toll supervisors and chief operators from the Independent industry and prominent traffic representatives of the Bell company. The idea of the conference came from the belief that such a meeting would afford an excellent opportunity for traffic and supervisory employes to become better acquainted, exchange ideas and, therefore, promote harmony and efficiency that would prove mutually beneficial. The results of this conference were quite satisfactory and it is believed that it will become a regular part of future meetings.

The officers re-elected for the coming year were: President, Minor Corman, Atmore; first vice president, Jas. N. Cox, Sr., Cookeville, Tenn.; second vice president, T. O. Crutchfield, Trussville; third vice president, J. E. Kirk, Scottsboro; secretary-treasurer, Earl McDonald, Fayette.

Directors re-elected were: Mr. Corman, chairman; G. R. McKelvey, Dothan; Jas. N. Cox, Jr., Fayette; Ward H. Snook, Foley; J. A. Miller, Jr., Fruitdale; R. C. Corr, Oneonta; G. A. Crenshaw, Greenville; H. W. Vaughan, Fayette, and W. T. Weaver, Collinsville.

Out of state visitors included A. N. Seward, vice president and general manager, Southeastern Telephone Co., Tallahassee, Fla.; Lamar McGehee, manager of the Marianna (Fla.) Telephone Co., and Allene M. Drew, president and manager of the Quincy (Fla.) Telephone Co.

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FRICTION . . . RUBBER

Buy Victory Bonds

USITA Offers Booklet on Small Exchange Dial Conversion

A 25-page booklet entitled *"The Economic Aspects of Small Office Dial Conversions,"* prepared by the Plant Committee of the United States Independent Telephone Association, has been made available to Independent telephone companies by the national association. Copies may be obtained from the association's headquarters, 411 Munsey Bldg., Washington 4, D. C., at 25 cents per copy.

The booklet does not cover types of available automatic equipment nor does it discuss the engineering phase of conversion, but it confines its discussion to the various economic aspects.

Among the subjects pertaining to dial conversions covered in the booklet are:

(1) Savings (reduction in traffic expense), additional costs and investments.

(2) Handling of toll and auxiliary services such as information, complaints, repair, etc.

(3) Necessary rate increases.

(4) Miscellaneous savings and additional costs such as elimination of local batteries, power costs, light water and heat expense.

(5) Commercial operations such as making collections, etc.

(6) Building costs.

(7) How to figure and what to include in estimates of central office and station equipment.

(8) Type of outside plant necessary for dial service.

(9) Maintenance costs in small dial exchanges.

(10) How to figure taxes, depreciation, insurance, etc.

(11) Suggested study tables and forms to make cost and income estimates.

Small telephone companies contemplating conversions to dial operation should be interested in securing a copy of the above booklet.

Principal credit for the booklet should go to F. E. Norris, of Santa Monica, Calif., chairman of the USITA Plant Committee at the time the study was embarked upon, and to those who served as members of the committee with him and assisted him in its preparation. The full membership was as follows:

F. E. Norris, Santa Monica, Calif., chairman; F. E. Behm, Lincoln, Neb.; B. C. Burden, Lincoln, Neb.; W. B. Clay, Hutchinson, Minn.; E. H. Danner, Fort Wayne, Ind.; C. E. Jones, Erie, Pa.; W. A. Kern, Rochester, N. Y.; J. W. Morrison, Rochester, N. Y., and N. M. Shenk, Tampa, Fla.

The membership of the present Plant Committee is: Mr. Jones, chairman; Mr. Behm; Mr. Burden; Mr. Clay; Mr. Morrison; F. M. Parsons, Chicago, Ill.; O. R. Roach, Fort Wayne, Ind.; Mr. Shenk, and F. G. Williamson, Bellevue, Ohio.

V V

Pennsylvania Company Starts Construction Program

The Denver & Ephrata Telephone & Telegraph Co., Ephrata, Pa., has begun a $100,000 construction and installation program designed to eliminate as quickly as possible its "waiting lists" of applications for telephone service which could not be filled because of war-caused shortages, C. E. Eaby, president, reported to the board of directors at its monthly meeting, October 25, on the telephone situation in the company's territory.

The company must complete several other projects, it was pointed out, including restoral of "margins" in central office and outside plant to provide for future growth, which is expected to be heavy in the next several years and continue the company's dial conversion program, which was interrupted by the war.

Continuation of the rural development program which was interrupted by the war also is included in the program.

Mr. Eaby pointed out that about 95 per cent of the rural population, in territory served by the local company, lived near enough to existing telephone lines so that service might be provided without public highway construction charges.

The company has just completed the project of replacing open wire between Ephrata and Lititz, Pa., with 8,900 ft. of cable, a project started before the war. This makes a continuous run of cable between Adamstown, Denver, Ephrata, Lititz and Manheim, which will give greater protection during storms.

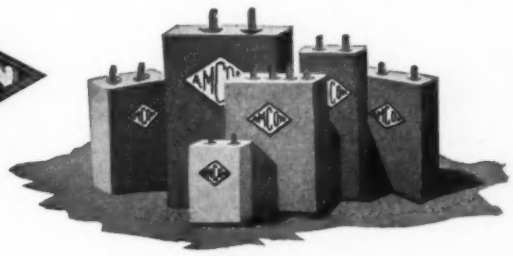
Another switchboard position will be added shortly at the Lititz and Manheim central offices and 15 miles of cable, 150 miles of copper wire and about 1,000 ft. of underground conduit will be added. This work will be done just as soon as the material is available. The company has made contracts for material totaling $100,000 which includes switchboards, telephones, cable, wire, poles, underground conduit and other miscellaneous items.

V V

Wisconsin Co-op Metallicizes

Work has been completed by the Prentice (Wis.) Telephone Co-operative, of installing a nine-mile metallic circuit. Fourteen subscribers now are being served on the new circuit.

AMCON



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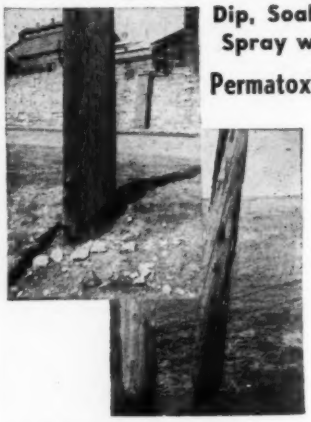

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PERMATOX "A" (5% pentachlorphenol in suitable petroleum solvents) affords an effective, economical preservative treatment . . . for the control of decay, shell-rot and termite attack.

Specify it for poles, posts, crossarms, ties, crossing planks, bridge timbers and other exposed construction. Soaking or pressure treatment insure adequate absorptions and deep penetration.

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Deaf Learn to "Hear" With Their Eyes

A young scientist, employed by Bell Telephone Laboratories, New York City, sat in a darkened room, his eyes fixed on a tiny screen in front of him. In a closed booth directly behind him, a young woman spoke quietly into a microphone. As she spoke, strange patterns glided smoothly across the screen.

Deaf since birth, and unable to speak intelligibly until a short time ago, the scientist, Edgar Bloom, "heard" her with his eyes through the wavy lines on the screen and made replies. Although proficient at lipreading, it was impossible for him to do so in this instance.

Thus recently was demonstrated at the laboratories a new and amazing apparatus known as the "translator," designed to teach the deaf to speak, which was developed during the war.

The translator looks like an eight-foot black box, turned up on end, with a slot and screen in front, and a great array of tubes and wire behind.

A laboratory technician explains it as follows: "When the sound reaches the machine through a microphone, the output of several filters is brought to one of a series of glow lamps in a vertical row. Passing through the field of light from the row of lamps is an endless belt, with phosphorescent material. As each lamp brightens and dims, a stream of light trails along the belt and so paints the patterns of visible speech. Passing out of sight, the pattern then is erased by infrared illumination to leave a clean surface for new patterns."

He said the apparatus was still in the experimental stage, and so far, had been tried out only on Mr. Bloom with satisfactory results.

The method of teaching is simple: Teacher and a deaf pupil sit before the machine and speak into a microphone. The teacher says, for instance, the word "house," and as she does so, over and over again, a strange pattern of vertical lines moves across the screen. The deaf pupil then attempts to create a similar pattern.

Eventually, it is thought, the apparatus may be adapted to telephone use for the deaf. Mr. Bloom has such a telephone in his office now. Instead of a receiver, it has a little screen on which the conversation at the other end of the line appears in running patterns. Instead of a bell, there is a flashing light. For the first time in his life, he can use the telephone.

With the translator, the speech patterns are fleeting and disappear almost as quickly as does the sound of the voice. But with another machine, the "spectograph," permanent records of visible speech can be made.

This latter device consists of a loop of magnetic tape on which sound is recorded. The loop is driven through a reproducer at the same rate that a paper-covered drum is rotated. On the paper, a stylus traces black vertical lines—the sound in terms of visible speech.

V V

Pacific T&T Announces 1946 Construction Program

An expenditure of $400,000,000 for new construction over a five-year period was announced December 18 by N. R. Powley, president of the Pacific Telephone & Telegraph Co. and its subsidiaries, Southern California Telephone Co. and Bell Telephone Co. of Nevada.

The postwar program is said to be the largest the companies have ever undertaken for any similar period. It will result in increasing present plant investment by almost 50 per cent to an amount aggregating upwards of a billion dollars.

"Our immediate task in which real strides are being made is to render service to all who want it and to restore and to take to new heights our prewar service," Mr. Powley stated. "In marching forward with the Pacific Coast, our program contemplates the restoration, as rapidly as possible, of the fundamental essentials, necessarily suspended in the war period, which our plant and service require. The execution and speed of the entire program is dependent, however, upon the flow of available manpower, materials, money and the level of business conditions."

Among the many important phases of the program are: Provision of plant for growth; replacement of plant to eliminate temporary war expedients; improvement of customers' equipment; replacement of manual equipment by dial; extension and improvement of rural service so that thousands of additional farms will be supplied adequately with telephone service; two-way communication telephone service to connect motor vehicles, boats of all kinds and trains with any other telephone; strengthening toll and long distance network, including provision for television and further use of radio facilities and many other projects to effect service improvements and extension of services, inclusive of provision of equipment for nationwide operator dialing on toll and long distance calls and subscriber dialing of such calls, in areas where applicable.

"The year 1946," Mr. Powley said, "as we now visualize it, will record an all-time high expenditure of upwards

of $90,000,000 for new construction, which, together with plant and materials re-used, will result in gross plant additions for the year of well over $100,000,000. This expenditure is more than double the estimated 1945 gross plant additions of $50,000,000."

The activities cover a broad field of construction. Some of the high lights are: The completion of more than 70 building projects; the addition of more than eight billion feet of wire in exchange cable; the addition of switching equipment for more than 270,000 new central office lines; the addition of more than 200,000 circuit miles of toll and long distance network, bringing this network to more than 1,800,000 miles. A major high light of the program is the start in 1946 of a $5,000,000 construction project in California, between the Colorado River and Los Angeles, of the company's part of a nationwide system of coaxial cables which will transmit television programs as well as telephone messages.

V V

Plan Two-Way Communication As Crime Fighter

The use of a mobile police unit, equipped with two-way communication system, was outlined as a plan to combat crime in New York City by its mayor-elect William O'Dwyer at a press conference held December 5 in El Centro, Calif.

Mr. O'Dwyer, as was reported by James P. McCaffrey, New York *Times* writer, said he had assurance from the war surplus division of the federal government for the transfer of walkie-talkie equipment for installation in patrol wagons and motorcycles now used by the New York Police Department. Mr. O'Dwyer is a former brigadier general in the army. He said he had requested Police Commissioner Arthur W. Wallander to make a survey of how much equipment would be needed and to study a plan for the training of police personnel.

As the Mayor-elect described his plan, the police department could use a patrol wagon for the central mobile unit with motorcycles and sidecars manned by police to blanket any particular area where there was an outbreak of lawlessness. He said this mobile unit, working with its two-way telephone system, could cover the entire area so that culprits could not escape even with speedy automobiles. Should the personnel of the unit fail to apprehend the culprits, the central mobile unit was still in a position to notify the borough headquarters of the transportation used in a departure from the scene.

The cost of the installation of the telephonic equipment for the mobile units, the mayor-elect said, would not be great. He said motorcycle policemen could be trained quickly for their new assignment.

V V

Louisiana Company Plans To Rebuild Two Exchanges

At a recent meeting of directors of the La Salle Telephone Co., Jena, La., plans were adopted for rebuilding the Jena and Jonesville exchanges and to make all necessary repairs and additions to its other exchanges, according to an announcement by W. F. Mackey, vice president and general manager of the company.

Mr. Mackey stated the program would begin immediately upon arrival of new equipment and material now on order.

Jena is to have a complete new exchange which will require a new switchboard, new telephones, and new outside cables. The exchange at Good Pine will be discontinued and brought in to Jena through a new cable extending from Jena and through Good Pine, and on to Trout, bringing all telephone users in that locality into the Jena exchange.

The Jonesville system will be built with new outside cables, new switchboards and new telephones, with additional lines extended from Jonesville to Harrisonburg to care for the additional subscribers in that territory. The company plans on spending several thousand dollars on these improvements.

V V

Wrong Number Saves Two Lives

The wrong telephone number is credited with saving the lives of Mrs. George Edwards and her son, Byron, 16, of Junction City, Kan.

Mrs. Edwards was already overcome by fumes from an open fireplace burner when her son, slightly dazed by the fumes, was roused by the ringing of the telephone. Although another number was requested, the boy was awakened to his mother's condition.

Shaking off his own stupor, he was able to save his mother.

V V

Students Earn as They Learn Telephone Work

In preparation for the heavy summer load of telephone traffic, the New York (N.Y.) Telephone Co. is offering high school girls the opportunity to earn pocket money while training to take over evening work next July.

A telephone operators' training

How to Build Better Lines at Lower Cost . . .

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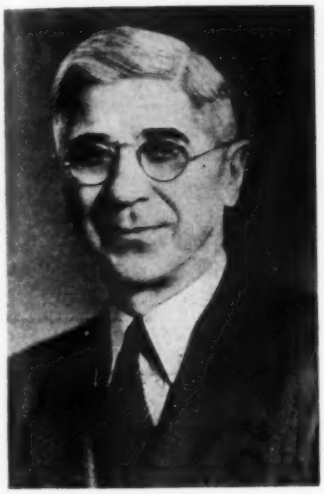

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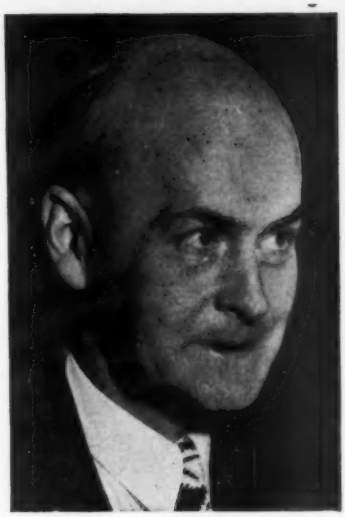

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SUB-CYCLE

For Better Ringing Service

Converts commercial AC service to powerful ringing current.

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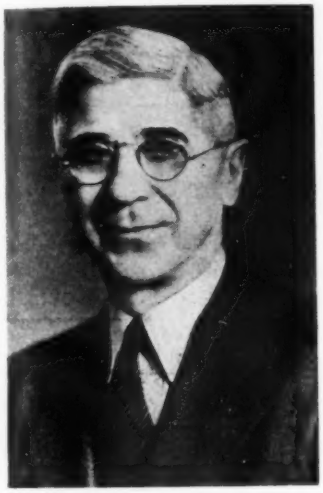

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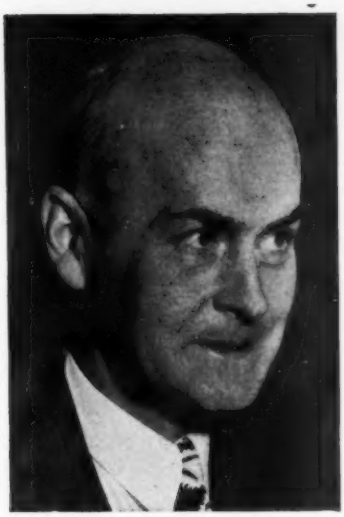

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